



On the relevance of Charney-Drazin (1961) for our understanding of the dynamical influence of the stratosphere on the troposphere.

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The year 2011 marks the 50th anniversary of the publication of the seminal paper “Propagation of planetary scale disturbances from the lower into the upper atmosphere” (Charney, J.G. and Drazin, P.G., 1961, JGR, 66, 83-109). The paper showed that the linear quasi-geostrophic propagation of steady planetary waves, forced in the troposphere, was analogous to the propagation of light, with a “refractive index” that depends on the mean zonal wind and vertical stratification. The paper was concerned with the conditions that allowed upward propagation and trapping, but it implicitly suggested that “top-down” dynamical influences of the stratosphere on the troposphere through the mechanism of planetary wave reflection were also possible. The present talk will trace the evolution of such suggested “top-down” mechanisms, which may allow forced changes in the stratosphere due to variations in solar UV radiation or enhanced greenhouse gases to be communicated to the surface. The paper will be presented from the perspective of a former Ph.D. student of Charney’s.